

What is the evolution of comparator and zero-crossing based circuit design?

Table 4 shows the evolution of comparator and zero-crossing based circuit design and performance since the development of the first prototype CBSC pipeline ADC. Every new design roughly halved the FOM while increasing the ENOB or the sampling rate or both. The latest design discussed in Section II-C is compared with the state of the art in Table 5.

What is a zero-crossing based circuit?

ZERO-CROSSING BASED CIRCUITS Since only the zero-crossing detection function is needed from the threshold detection comparator in a CBSC circuit, the comparator can be replaced by a zero-crossing detector (ZCD). A dynamic inverter shown in Fig. 1 can be employed as a ZCD. Initially, the output voltage V_P of the ZCD is charged up to V_{DD} .

Can zero-crossing A/D converters reduce power consumption?

A vast stride has been made in zero-crossing based A/D converters and discusses the technical issues unique to these A/D converters as well as solutions to improve performance and functionality simultaneously.

What is a zero-crossing detector?

In zero-crossing detectors, leading to the development of zero-crossing based circuits for faster speed and lower power. All technology has progressed at a much slower pace, making facets of performance including the sampling rate, effective low-power circuit design critical.

Why do we need zero-crossing detection for a high-performance analog-to-digital converter (ADC)?

However, this trend increases the performance demand on analog-to-digital converters (ADCs), which are analog circuits themselves. In order to address ultra-low-power design for the high-performance ADCs that are demanded of modern electronics systems, we have developed a new ADC architecture based on zero-crossing detection.

How to prevent multiple zero-crossing detection?

An alternative solution to preventing multiple zero-crossing detection is to introduce transient rejection time after the detection of a zero-crossing by the ZCD circuit. During the transient rejection time, output of the ZCD circuit does not change in response to zero-crossing of the input.

4-9 Dynamic Zero-Crossing Detector (ZCD) 4-10 A zero-crossing based switched-capacitor (ZCBC) integrator which replaces ZCD block in Fig 25 with a dynamic zero-crossing detector. 4-11 Timing diagram (Integration Phase) 4-12 A zero-crossing based switched-capacitor (ZCBC) integrator which has nmos current source

Harmonics are caused by nonlinear loads such as a saturated inductor or a capacitor with a large voltage coefficient (that is dryers and refrigerators). Transients can occur due to switching of ...

Zero-crossing switches - Also called synchronous switches or breakers, these switches represent a relatively new technology used to reduce capacitor switching transients. Zero-crossing switches time the closing of each phase to correspond with the zero crossing of the phase voltage. The electronic controls monitor such parameters as stored energy, ambient temperature, time ...

In this thesis, we explore zero-crossing based circuits (ZCBC) in high-order differential switched-capacitor filters to replace area inefficient op-amps-based continuous-time base-band filters.

Download Citation | A zero-crossing switched-capacitor filter design | Thesis (S.M.)--Massachusetts Institute of Technology, Dept. of Electrical Engineering and Computer Science, 2008. Includes ...

Diode technology uses power diodes to naturally energize the capacitor banks with the network voltage, starting exactly from the zero crossing thanks to network voltage synchronization. The diodes are then bypassed after a quarter of cycle, namely at zero current crossing, to avoid power losses and overheating.

As an effort to improve the energy efficiency of switched-capacitor circuits, zero-crossing- based integrators (ZCBI) that consist of zero-crossing detectors and charging circuits have been proposed.

programmable capacitors, programmable connectivity, and adjustable biasing [3]. This paper demonstrates a highly-reconfigurable analog system that can be used to implement a pipelined ADC and switched-capacitor filters. Zero-crossing based circuits are utilized for superior power efficiency and reconfigurability. II.

SYSTEM DESCRIPTION

crossing detection signal based on an AC line input. The use of switched-capacitor filters helps to ensure minimal zero-crossing delay while tracking change in the input frequency and provides higher precision and a m.

based switched-capacitor circuit, analog-to-digital (A/D) con-verters based on virtual ground detection have made steady and significant progress. Comparators have been replaced by zero-crossing detectors, leading to the development of zero-crossing based circuits for faster speed and lower power. All

This paper focuses on recent implementations of zero-crossing based A/D converters and discusses the technical issues unique to these A/D converters as well as ...

system capacitor switching time based on expert decision­ making control strategies. When the system needs for reactive power compensation, the controller uses reference voltage phase ...

Capacitor Zero Crossing Technology

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As an effort to improve the energy efficiency of switched-capacitor circuits, zero-crossing- based integrators (ZCBI) that consist of zero-crossing detectors and charging circuits have been proposed. To break the trade-off between accuracy and speed, ZCBI typically employs a two-phase charging scheme that relies on an additional ...

Zero-Crossing-Based Integrators (ZCBI) are energy- efficient alternatives to conventional switched-capacitor integrators that are typically implemented using operational transconductance amplifiers (OTAs). However, ZCBI suffer from signaldependent overshoot errors and increased dynamic power consumption due to inherent reset operation. This ...

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